

ENR 1.7 – ALTIMETER SETTING PROCEDURES**1. Introduction**

- 1.1. The altimeter setting procedures in use within Flight Information Regions of Chennai, Delhi, Guwahati, Kolkata and Mumbai generally conforms to those contained in Doc.4444-PANS/ATM Part II, Section 12.
- 1.2. Transition altitudes for all aerodromes are given in the tabulation in ENR 1.7-4. Transition altitudes are also indicated in the Instrument approach charts.
- 1.3. QNH reports and temperature information for use in determining adequate terrain clearance is provided in meteorological broadcast and is available on request from Air traffic service units. QNH values are given to the lower whole HPa.

2. Basic Procedure**2.1. General**

- 2.1.1. A transition altitude is specified for each aerodrome. No transition altitude is less than 100 M (4000 Ft).
- 2.1.2. Vertical positioning of aircraft when at or below the transition altitude is expressed in terms of altitude whereas such positioning at or above the transition level is in terms of flight levels. While passing through the transition layer, vertical positioning is expressed in terms of altitude when descending, and in terms of flight level when ascending.
- 2.1.3. Flight level 0 (zero) is located at the atmosphere pressure level of 1013.2 HPa (29.92 inches).
- 2.1.4. Consecutive flight levels are separated by a pressure interval corresponding 152.4M (500 Ft) in the standard atmosphere.

Note: Example of the relationship between flight levels and altimeter indications are given in the following tables, the metric equivalents being approximate.

| Flight Level | Altimeter (Ft) | Indication (M) |
|--------------|----------------|----------------|
| -90 | -1000 | -300 |
| -95 | -500 | -150 |
| 0 | 0 | 0 |
| 5 | 500 | 150 |
| 10 | 1000 | 300 |
| 15 | 1500 | 450 |
| 20 | 2000 | 600 |
| 50 | 5000 | 1500 |
| 100 | 10000 | 3050 |
| 150 | 15000 | 4550 |
| 200 | 20000 | 6100 |

2.2. Take-off and Climb

- 2.2.1. QNH altimeter setting is made available to aircraft in taxi clearance prior to take off.
- 2.2.2. Vertical positioning of aircraft during climb is expressed in terms of altitude until reaching the transition altitude above which vertical positioning is expressed in terms of flight levels.

2.3. Vertical Separation Enroute

- 2.3.1. Vertical separation during enroute flight shall be expressed in terms of flight level at all times. Except when flying in the vicinity of an aerodrome at or below transition altitude.

2.4. Approach and Landing

- 2.4.1. A QNH altimeter setting is made available in the routine approach and landing instructions. The altimeter setting obtained on radio telephone shall be read back to the ATS unit.
- 2.4.2. Vertical positioning of aircraft during approach is controlled by reference to flight levels until reaching the transition level below which vertical positioning is controlled by reference to altitude.

2.5. Missed Approach

2.5.1. The relevant portions of 2.1.2, 2.2 and 2.4 shall be applied in the case of a missed approach.

3. Procedures applicable to operators (including pilots)

3.1. Flight Planning

3.1.1. The levels at which a flight is to be conducted shall be specified in a flight plan-

- i) in terms of flight level if the flight is to be conducted at or above the transition level, and
- ii) in terms of altitude if the flight is to be conducted in the vicinity of an aerodrome and at or below the transition altitude.

3.2. Minimum Flight Altitude

3.2.1. Pilot must ensure that in Instrument Meteorological Conditions and at night an aircraft is not descended below the minimum safe en-route altitude until over a known aid at the aerodrome, the only exception being when the position of the aircraft is positively established by reference to a Radio/ATS Radar aid within the initial approach area, where the initial approach altitude or associated sector altitude apply.

4. System of Cruising level

4.1. All VFR flights above 3,000 Ft from the ground and water and all IFR flights, when in level cruising flight levels appropriate to their magnetic tracks in accordance with the table set forth hereunder.

4.2. In controlled airspace, the correlation of levels to track as prescribed in Tables of cruising levels shall not apply whenever otherwise indicated in Air Traffic Control Clearances.

4.3. All flights shall be conducted in accordance with Instrument Flight Rules when operated at or above FL 150. However, Indian Military aircraft may operate VFR flights between FL 150 and FL 285 at appropriate levels given in Table of cruising levels when flying -

- i) In VMC
- ii) Outside controlled airspace and
- iii) Unable to establish contact with appropriate ATS units.

5. Changing levels

5.1. A pilot-in-command shall read back level clearance.

5.2. When required, the pilot-in-command may be instructed to reach an assigned level by a specified time or position and at a specified rate of climb or descend. The pilot-in-command shall advise ATC immediately if he is doubtful whether the assigned level can be reached as instructed.

5.3. An aircraft may be required to change level at a time, place or rate specified by ATC. The pilot-in-command shall effect a level change as soon as possible but not later than 1 minute after the time specified.

5.4. A pilot-in-command shall report:

1. at the time of leaving a level for newly assigned level
2. When leaving or passing through such other levels as may be specified by ATC
3. On reaching an assigned level.

6. Table of cruising level

Intentionally
Left
Blank

| Magnetic Track From 000 ⁰ to 179 ⁰ | | | | | | Magnetic Track From 180 ⁰ to 359 ⁰ | | | | | |
|---|-------|-------|----------------------|-------|-------|---|-------|-------|----------------------|-------|-------|
| IFR Flight Altitudes | | | VFR Flight Altitudes | | | IFR Flight Altitudes | | | VFR Flight Altitudes | | |
| FL | Meter | Feet | FL | Meter | Feet | FL | Meter | Feet | FL | Meter | Feet |
| -90 | | | | | | 0 | | | | | |
| 10 | 300 | 1000 | | | | 20 | 600 | 2000 | | | |
| 30 | 900 | 3000 | 35 | 1050 | 3500 | 40 | 1200 | 4000 | 45 | 1350 | 4500 |
| 50 | 1500 | 5000 | 55 | 1700 | 5500 | 60 | 1850 | 6000 | 65 | 2000 | 6500 |
| 70 | 2150 | 7000 | 75 | 2300 | 7500 | 80 | 2450 | 8000 | 85 | 2600 | 8500 |
| 90 | 2750 | 9000 | 95 | 2900 | 9500 | 100 | 3050 | 10000 | 105 | 3200 | 10500 |
| 110 | 3350 | 11000 | 115 | 3500 | 11500 | 120 | 3650 | 12000 | 125 | 3800 | 12500 |
| 130 | 3950 | 13000 | 135 | 4100 | 13500 | 140 | 4250 | 14000 | 145 | 4400 | 14500 |
| 150 | 4500 | 15000 | 155 | 4700 | 15500 | 160 | 4900 | 16000 | 165 | 5050 | 16500 |
| 170 | 5200 | 17000 | 175 | 5350 | 17500 | 180 | 5500 | 18000 | 185 | 5650 | 18500 |
| 190 | 5800 | 19000 | 195 | 5950 | 19500 | 200 | 6100 | 20000 | 205 | 6250 | 20500 |
| 210 | 6400 | 21000 | 215 | 6550 | 21500 | 220 | 6700 | 22000 | 225 | 6850 | 22500 |
| 230 | 7000 | 23000 | 235 | 7150 | 23500 | 240 | 7300 | 24000 | 245 | 7450 | 24500 |
| 250 | 7600 | 25000 | 255 | 7750 | 25500 | 260 | 7900 | 26000 | 265 | 8100 | 26500 |
| 270 | 8250 | 27000 | 275 | 8400 | 27500 | 280 | 8550 | 28000 | 285 | 8700 | 28500 |
| 290 | 8850 | 29000 | | | | 300 | 9150 | 30000 | | | |
| 310 | 9450 | 31000 | | | | 320 | 9750 | 32000 | | | |
| 330 | 10050 | 33000 | | | | 340 | 10350 | 34000 | | | |
| 350 | 10650 | 35000 | | | | 360 | 10950 | 36000 | | | |
| 370 | 11300 | 37000 | | | | 380 | 11600 | 38000 | | | |
| 390 | 11900 | 39000 | | | | 400 | 12000 | 40000 | | | |
| 410 | 12500 | 41000 | | | | 430 | 13100 | 43000 | | | |
| 450 | 13700 | 45000 | | | | | | | | | |

7. List showing transition altitude for aerodromes in India

| S No | Name of the aerodrome | Transition altitude in Feet |
|------|-----------------------|-----------------------------|
| 1 | Agatti | 4000 |
| 2 | Agra | 4000 |
| 3 | Agartala | 4000 |
| 4 | Ahmedabad | 4000 |
| 5 | Akola | 4000 |
| 6 | Allahabad | 4000 |
| 7 | Amritsar | 4000 |
| 8 | Aurangabad | 5000 |
| 9 | Bagdogra | 13000 |
| 10 | Balurghat | 4000 |
| 11 | Barapani (Shillong) | 9000 |
| 12 | Bangalore | 6000 |
| 13 | Behala | 4000 |
| 14 | Belgaum | 6000 |
| 15 | Bhavnagar | 4000 |
| 16 | Bhopal | 4000 |
| 17 | Bhubaneswar | 4000 |
| 18 | Bhuj | 4000 |
| 19 | Bilaspur | 4000 |
| 20 | Calicut | 10000 |
| 21 | Chakulia | 4000 |
| 22 | Chandigarh | 10000 |
| 23 | Chennai | 4000 |
| 24 | Cochin International | 6500 |
| 25 | Coimbatore | 11000 |
| 26 | Cooch Behar | 5000 |
| 27 | Cuddapah | 4000 |
| 28 | Daparizo | Not Established |
| 29 | IGI Airport, Delhi | 4000 |
| 30 | Safdarjung, Delhi | 4000 |
| 31 | Deesa | 4000 |
| 32 | Dehradun | 11000 |
| 33 | Dibrugarh (Mohanbari) | 8000 |
| 34 | Dimapur | 11000 |
| 35 | Guwahati | 7000 |
| 36 | Gaya | 4000 |
| 37 | Goa | 5000 |
| 38 | Gorakhpur | 4000 |
| 39 | Gwalior | 4000 |
| 40 | Hyderabad | 7000 |
| 41 | Imphal (Tulihal) | 11000 |
| 42 | Indore | 5000 |
| 43 | Jabalpur | 5000 |
| 44 | Jaipur | 5000 |
| 45 | Jamshedpur | 5000 |
| 46 | Jammu | 11000 |
| 47 | Jamnagar | 4000 |
| 48 | Jhansi | 4000 |
| 49 | Jharsugda | 7000 |
| 50 | Jodhpur | 4000 |
| 51 | Junagarh (Keshod) | 6000 |
| 52 | Kamalpur | Not Established |

| S No | Name of the aerodrome | Transition altitude |
|------|----------------------------|---------------------|
| 53 | Kailashahar | 4000 |
| 54 | Kandla | 4000 |
| 55 | Kanpur (Chakeri) | 4000 |
| 56 | Khandwa | 5000 |
| 57 | Khajuraho | 4000 |
| 58 | Kolhapur | 5000 |
| 59 | Kolkata | 4000 |
| 60 | Kota | 4000 |
| 61 | Kulu (Bhuntar) | 23000 |
| 62 | Lalitpur | 5000 |
| 63 | Leh | Not Established |
| 64 | Lengpui | 6500 |
| 65 | Lucknow | 4000 |
| 66 | Ludhiana | Not Established |
| 67 | Madurai | 6000 |
| 68 | Malda | Not Established |
| 69 | Mangalore | 8000 |
| 70 | Muzaffarpur | 4000 |
| 71 | Mumbai, C.S.I | 4000 |
| 72 | Mumbai, Juhu | 4000 |
| 73 | Mysore | 6000 |
| 74 | Nanded | Not Established |
| 75 | Nagpur | 5000 |
| 76 | North Lakhimpur (Lilabari) | 11000 |
| 77 | Panagarh | 4000 |
| 78 | Pantnagar | 11000 |
| 79 | Passighat | |
| 80 | Patna | 4000 |
| 81 | Pondicherry | |
| 82 | Porbandar | 4000 |
| 83 | Port Blair | 4000 |
| 84 | Pune | 7000 |
| 85 | Puttaparthi | 5000 |
| 86 | Raipur | 5000 |
| 87 | Rajamundry | 5000 |
| 88 | Rajkot | 4000 |
| 89 | Ramnad | 4000 |
| 90 | Ranchi | 6000 |
| 91 | Ratnagiri | Not Established |
| 92 | Rupsi | 4000 |
| 93 | Sholapur | 5000 |
| 94 | Silchar (Kumbhigram) | 8000 |
| 95 | Simla | 13000 |
| 96 | Srinagar | 20000 |
| 97 | Surat | 4000 |
| 98 | Tanjore | 4000 |
| 99 | Tezpur | 7000 |
| 100 | Tezu | Not Established |
| 101 | Tiruchirapalli | 4000 |
| 102 | Tirupati | 8000 |
| 103 | Thiruvananthapuram | 8000 |
| 104 | Udaipur (Dabok) | 6000 |

| S No | Name of the aerodrome | Transition altitude |
|------|-----------------------|---------------------|
| 105 | Vadodara | 4000 |
| 106 | Varanasi | 4000 |
| 107 | Vellore | 5000 |
| 108 | Vijaywada | 4000 |
| 109 | Vishakhapatnam | 7000 |
| 110 | Warangal | 4000 |

8. Position reporting

8.1. Transmission of position report

- 8.1.1. The pilot shall report position as soon as possible after the aircraft has passed over each designated reporting point of ATS route defined by designated significant points. Additional reports over other points may be requested by ATC when so required for air traffic management (ATM) purposes.
- 8.1.2. On routes not defined by designated significant points, position reports shall be made after the first half hour of flight and at hourly interval thereafter. Additional reports at shorter intervals of time may be requested by ATC units when so required for ATS purposes.
- 8.1.3. The position reports required by 8.1.1 and 8.1.2 shall be made to the ATS unit serving the airspace in which the aircraft is operated on appropriate VHF RTF frequency. When outside VHF RTF range, the pilot-in-command shall report positions on HF RTF. In addition, the last position report before passing from one flight information region or control area to an adjacent flight information region or control area shall be made to the ATS unit serving the airspace about to be entered.
- 8.1.4. Flights may be exempted from making position reports at each designated reporting point or interval, if adequate flight progress data is available from radar.
- 8.1.5. All aircraft transiting from one FIR to another FIR shall transmit for FIR boundary and flight level to the ATS unit serving the FIR to be entered at least 10 minutes prior to entry.
Note – This provision will not apply to aircraft transiting from one Indian FIR to another Indian FIR. Provisions will continue to apply to all aircraft, when transiting from a foreign FIR to an Indian FIR except where specifically indicated otherwise against an ATS route.
- 8.1.6. Ten (10) minutes prior to crossing an established ATS route, pilot-in-command shall transmit the following information to the ATC unit serving the airspace-
- Call-sign of the aircraft
 - Estimate time of crossing the route
 - Flight level
 - Position of crossing the route with reference to a navigational aid or geographical position on the route. Aircraft will join or cross ATS routes at or close to designated reporting points. Aircraft crossing the route shall do so at an angle of 90⁰, to the direction of the route and at a level appropriate to the magnetic track.
- 8.1.7. Listening watch shall be maintained on appropriate communication frequency throughout the flight along the ATS routes.

9. Content of the position report

- 9.1. When reporting their position, pilots shall transmit the word 'POSITION' either immediately before or after the call-sign of their aircraft.
- 9.2. Position reports shall have the following elements of information-
- aircraft identification
 - position
 - time
 - flight level or altitude
 - next position and time over
 - ensuing significant point
- 9.3. Routine air-report
- 9.3.1. Pilots shall give the following meteorological information once in each FIR along with position report at designated MET reporting points on international and national ATS routes as detailed on page GEN 3.5-6.

9.3.2. Meteorological information

- i) air temperature
- ii) wind direction
- iii) wind speed
- iv) turbulence
- v) aircraft icing
- vi) humidity (if available)

9.4. Special air-report

9.4.1. Special air-report shall be made by all aircraft whenever anyone or more of the following conditions are encountered or observed-

- i) Clear air turbulence
- ii) Severe turbulence
- iii) Severe icing
- iv) Severe mountain wave
- v) Thunder storms without hail that are obscured, embedded, widespread or in squall-lines
- vi) Thunder storm with hail that are obscured, embedded, widespread or in squall-lines
- vii) Heavy dust storm or heavy sandstorm
- viii) Volcanic ash cloud
- ix) Pre-eruption volcanic activity or a volcanic eruption

9.5. Transmission of ADS report

9.5.1. The position report shall be made automatically to the air traffic service unit serving the airspace in which the aircraft is operating. The requirement for transmission and content of ADS report shall be established by the controlling ATC unit on the basis of current operational conditions and communicated to the aircraft and acknowledged through an ADS agreement.

9.5.2. Content of the ADS report

9.5.2.1 ADS report shall be composed of data-blocks selected from the following-

- i) Basic ADS - Latitude, Longitude, Altitude, Time, Figure of merit
- ii) Ground vector - Track, Ground speed, Rate of climb or descent
- iii) Air vector - Heading, Mach or IAS, Rate of climb or descent
- iv) Projected profile - Next way-point, Estimated altitude at next way-point, Estimated time at next way-point, (Next+1) way-point, Estimated altitude at (Next+1) way-point, Estimated time at (Next+1) way-point
- v) Meteorological information - Wind speed, Wind direction, Temperature, Turbulence (if available), Humidity (if available)
- vi) Short-term intent - Latitude at projected intent point, Longitude at projected intent point, Altitude at projected intent point, Time of projection
- vii) If an altitude, track or speed change is predicted to occur between the aircraft's current position and the projected intent point, additional information would be provided in an intermediate intent block as – Distance from current point to change point, Track from current to change point, Altitude at change point, Predicted time to change point.
- viii) Extended projected profile (in response to an interrogation from the ground system) – Next way-point, Estimated altitude at the next way-point, Estimated time at next way-point, (Next+1) way-point, Estimated altitude at (Next+1) way-point, Estimated time at (Next+1) way-point, (Next+2) way-point, Estimated altitude at (Next+2) way-point, Estimated time at (Next+2) way-point (repeated for upto [Next+128] waypoints).

9.5.3. The basic ADS data block shall be required from all ADS equipped aircraft. Remaining ADS data blocks shall be included as necessary. In addition to any requirement concerning its transmission for ATS purposes, data block at v) Meteorological information shall be transmitted in accordance with Annex 2, para 5.4.1.

9.5.4. In addition to the above data blocks, other information shall be transmitted, including a block identifier, aircraft identification and 24-bit aircraft address.